

ABSTRACT

The present application describes bit design methods (and corresponding bits, drilling methods, and systems) in which the three-dimensional trajectory of an individual tooth cutting into the formation can be obtained and visualized from computer drilling simulator. In order to improve the drilling efficiency of each tooth, it is necessary to orient the tooth three-dimensionally in such a way that its longer crest is perpendicular to the scraping direction, and the top part of the tooth is angled to follow the indentation direction. Such a three-dimensional orientation allows the stress across the surface of the tooth to be more uniformly distributed, thereby, reducing breakage of the tooth.